

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-28 are pending in the application, with claims 1, 13, and 23 being the independent claims. Claims 1, 2, 3, 6, 9-14, and 19-23 are sought to be amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Objections to the Claims

On page 2 of the Office Action, claims 1 and 13 were objected to for lack of proper antecedent basis. Claims 1 and 13 have been amended accordingly. Applicants respectfully request that the Examiner reconsider and withdraw the objection to claims 1 and 13.

Rejections under 35 U.S.C. § 112

On page 2 of the Office Action, claims 1-22 were rejected under 35 U.S.C. 112, second paragraph, as being allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regard as the invention. Applicants respectfully traverse this rejection.

To expedite prosecution, however, independent claims 1 and 13 have been amended to address the Examiner's concern. Claims 2, 3, 9-12, 14, 19 and 22 were

rejected because they depend from rejected claims 1 and 13, which have been amended. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

Rejections under 35 U.S.C. § 101

On page 2 of the Office Action, claims 23-28 were rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. This rejection is respectfully traversed.

To expedite prosecution, claim 23 has been amended to address the Examiner's concern. Amended claim 23 is a new and useful process because one or more of its elements recites the manipulation of data representing physical objects or activities (pre-computer process activity). Section 2106 IV.B.2(b) of the Manual Patent Examining Procedure (MPEP) states:

[a]nother statutory process is one that ***requires the measurements of physical objects or activities to be transformed outside of the computer into computer data*** (In re Gelnovatch, 595 F.2d 32, 41 n.7, 201 USPQ 136, 145 n.7 (CCPA 1979) (data-gathering step did not measure physical phenomenon); Arrhythmia, 958 F.2d at 1056, 22 USPQ2d at 1036), where the data comprises signals corresponding to physical objects or activities external to the computer system, and where the process causes a physical transformation of the signals which are intangible representations of the physical objects or activities. Schrader, 22 F.3d at 294, 30 USPQ2d at 1459 citing with approval Arrhythmia, 958 F.2d at 1058-59, 22 USPQ2d at 1037-38; Abele, 684 F.2d at 909, 214 USPQ at 688; In re Taner, 681 F.2d 787, 790, 214 USPQ 678, 681 (CCPA 1982).

MPEP § 2106 IV.B.2(b) (emphasis added).

Claim 23 recites at least the following elements that require "the measurements of physical objects or activities to be transformed outside of the computer into computer

data": (1) measuring temperatures of a plurality of regions of a substrate having a plurality of alignment features on a surface of the substrate; and (2) measuring a spatial distribution of the alignment features at a first region at the measured substrate temperature. Accordingly, claim 23 is a new and useful process under 35 U.S.C. § 101. Applicants respectfully request that the Examiner reconsider and withdraw this rejection. Additionally, Applicants note that claim 23 has been amended in a broadening manner.

Rejections under 35 U.S.C. § 102

On page three of the Office Action, claims 23-28 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.K. Patent Application No. 2321316 to Hashimoto ("Hashimoto"). Applicants respectfully traverse the rejection and request that it be withdrawn.

Differences exist between Hashimoto and amended claim 23, which is reproduced below for the Examiner's convenience.

23. A method comprising:
measuring temperatures of a plurality of regions of a substrate having a plurality of alignment features on the substrate's surface;
measuring a spatial distribution of the alignment features at one of the regions at the measured substrate temperature; and
determining a dimensional response from differences between a predetermined spatial distribution and the measured spatial distribution.

Hashimoto does not teach "measuring temperatures of a plurality of regions of a substrate" and "measuring a spatial distribution of the alignment features at one of the regions *at the measured substrate temperature.*" Hashimoto discloses a correction system whereby:

a target substrate temperature T2 is determined. Let us consider, for example, that the temperature of the semiconductor substrate 35 is 23 C, the design distance between alignment marks is 100mm, and the error between the two alignment marks is -0.5 um (the board has contracted with respect to the design values). Using equations (1) and (2), the target substrate temperature T2 can be calculated as about 24.92.

Hashimoto, p. 18, lines 10-18. Thus, according to Hashimoto, T1 is known and T2 is derived through equations (1) and (2), **not measured**. Further, the error between the two alignment marks is measured when T2 is unknown. Thus, the error between the two alignment marks is not measured at T2. In contrast, claim 23 recites "measuring a spatial distribution . . . at the measured substrate temperature."

Additionally, in order to derive T2, equations (1) and (2) must be solved simultaneously with equations (3) and (4), which describes the relationships between the length, the temperature, and the coefficient of thermal expansion of a substrate. Collectively, these equations form a pre-assumed model of the substrate. *See* p. 17, lines 5-16. Hashimoto merely uses the pre-assumed model to derive T2 in order to correct for the thermal expansion. *See* p. 18, lines 21-25. In contrast, claim 23 recites "deriving a model of the dimensional response from differences between the predetermined spatial distribution and the measured spatial distribution." Moreover, Applicants' technique is not suggested by Hashimoto.

Accordingly, claim 23 is patentable over Hashimoto. Claims 24-28 depend from claim 23 and are thus patentable over Hashimoto for at least the reasons provided above, and in view of their own features. Applicants therefore request that the Examiner reconsider and withdraw the rejection of claims 23-28.

On page four of the Office Action, claims 1-22 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,061,119 to Ota ("Ota"). Applicants respectfully traverse this rejection and request that it be withdrawn.

Differences exist between Ota and amended claims 1 and 13. Ota does not teach at least the following: "a temperature measuring system that measures a respective temperature of a plurality of regions of the substrate," as recited in claim 1; and "measuring a respective temperature of a plurality of regions of the substrate," as recited in claim 13. Nowhere does Ota teach measuring the temperature of the substrate at a plurality of regions.

In rejecting the above element of claims 1, the Examiner cited Col. 4, lines 25-45 and Col. 8, lines 30-43. However, Col. 4, lines 25-45 merely describe the effect of atmospheric temperature changes on a wafer, and Col. 8, lines 30-43 merely describe a "temperature at the time of measurement of (CRX_j, CRY_j) and the temperature at the time of measurement in the exposure apparatus" Applicants note that it is not clear from Col. 8, lines 30-43 the temperature of what is being measured. However, from Col. 4, lines 42-54, it appears that it is the atmospheric temperature of the system that is being measured since it is cited as the cause of wafer expansion. Further, according to Ota, once the shot magnification is calculated and "upon alignment before exposure . . . the temperature of the wafer itself may also be at any degree." Col. 8, lines 53-54. This suggests that the substrate temperature is not important and therefore it is not being measured.

Accordingly, claim 1 is patentable over Ota. Similarly, claim 13 is also patentable over Ota for the same reasons that it does not teach "measuring a respective

temperature of a plurality of regions of the substrate." Claims 2-12 depend from claim 1. Claims 14-22 depend from claim 13. These dependent claims are thus patentable over Ota for at least the reasons presented, and in view of their own features. Applicants therefore request that the Examiner reconsider and withdraw the rejection of claims 1-22.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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